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10/771,091

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EXAMINER

ROY, SIKHA

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/771,091 | Applicant(s) LEE ET AL. | |
| | Examiner Sikha Roy | Art Unit 2879 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-14 and 18-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-17 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The Response, filed on October 2, 2007 has been entered and acknowledged by the Examiner. Regarding objection to claims 16 and 17 the Examiner notes that no amendment (as disclosed by the Applicant page 2 paragraph 4, Remarks section) to claims 16 and 17 has been received and hence the objection still applies.

Claims 1-14 and 18-20 have been withdrawn and claims 15-17 and 21 are pending for prosecution.

Claim Objections

Claims 16 and 17 are objected to because of the following informalities:

Claims 16 and 17 are shown as withdrawn but they are pending and hence '(withdrawn)' should be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15 –17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2349979 to Burroughes et al. and in view of U.S. Patent 6,737,800 to Winters et al. and U.S. Patent 6,750,087 to Morita et al.

Regarding claim 15 Burroughes discloses (Fig. 3 page 6 paragraphs 2,3 page 10 paragraphs 3,4) a method of fabricating an organic electroluminescent display comprising the steps of disposing sequentially a first anode material (reflective metallic layer 12) and a second anode material (ITO layer) 13 of pixels 20 on a substrate 10, masking and etching the first and second anode materials to isolate and form anode electrodes of different pixels, each including first anode electrode 12 and second anode electrode 13, disposing organic thin film layers 14,15 patterned on the second anode electrode and then disposing cathode electrode 16 over the entire surface of the substrate. Burroughes discloses (page 3 last paragraph) the first metallic anode electrode is suitably reflective, made of aluminum layer and the second anode material made of ITO has a relatively high work function (page 4 paragraphs 3,4). Furthermore the Examiner notes that the second anode of Burroughes is made of ITO, the same material as that of the second film of the applicant and hence will have the same inherent capability of adjusting work function.

Regarding claim 15 Burroughes discloses (Fig. 3 page 4 last paragraph) a multi-pixel light emitting device having different pixels with region suitably comprising one or more individual organic materials, suitably polymers or conjugated polymers. Burroughes does not exemplify red, green and blue unit pixels (which is very well known in the art for multi-color display) and the second anode of at least one pixel having a thickness different from the thickness of the second anodes of other unit pixels of red, green and blue pixels.

Winters in same field of endeavor discloses (Figs. 1 and 3 column 3 lines 40 through column 4 line 6, column 4 lines 19-34, column 17 lines 4-12, column 18 lines 17-61) method of forming organic electroluminescent display having pixels of red, green and blue (three primary colors) comprises forming first anode electrodes (reflective layer) 102 and second anode electrodes (first transparent electrode) 112, disposing respective organic thin film layers and disposing a cathode electrode on the entire surface of the substrate. Winters further discloses the thickness of the second anode electrode 112a in one pixel (red pixel) is different from the thicknesses of the second anodes 112b, 112c of other unit pixels of green and blue and are formed by well known photolithography and etching processes. Winter teaches (column 18 lines 50-65) the thicknesses of second anode electrodes for different pixels are varied so that reflected components of light emitted from a particular colored pixel constructively interfere with non-reflected component and thus enhance the emission efficiency.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include red, green and blue unit pixels of three primary colors and thickness of second anode of at least one unit pixel of one color different from that of other unit pixels as taught by Winters in the method of forming organic electroluminescent display of Burroughes for providing a multicolor display and the benefit of reflected components of light of a particular color emitted from one colored pixel constructively interfere with non-reflected component and thus enhance the emission efficiency.

Burroughes and Winters disclose the second anode of at least one pixel different in thickness from other second anode of red, green and blue pixel units but are silent about the first and second anode materials patterned by using photosensitive film patterns having thicknesses different from each other depending upon the red, green and blue unit pixels.

Morita in analogous field discloses (Figs. 9-12 col. 9 lines 27-48, col. 10 lines 1-27) the method of forming source and drain electrodes and the active area in a thin film transistor consists of forming a metal film 16, normal resist film 17 over the metal film and then using half-tone mask, the resist pattern having two different film thickness patterns 17a and 17b are formed and then etching is performed to form the electrodes. The half-tone mask comprises a transparent section over a part that corresponds to the normal film thickness resist pattern 17a, a semi-transparent section over a part that corresponds to the thin film resist pattern 17b and light-shielding section over other parts. Morita teaches it is thus possible to form a resist pattern of varying film thickness by means of a single process thus ensuring reduction in the number of steps.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to employ the fabrication method of forming the first and second anodes of different thickness of Burroughes and Winters by etching the photosensitive film patterns having different thicknesses formed by halftone mask as taught by Morita. This method provides the benefit of forming two different second anodes in a single masking operation and thus simplifies the fabrication method.

Regarding claim 16 Winters discloses (Fig. 3) the second film of 112a of red unit pixel is thicker than the other unit pixels.

Regarding claim 17, Burroughes, Winters disclose the claimed invention except for the limitation of the thickness of second film of red pixel in the range of 250 to 450°A and 700 to 750 °A, thickness of second film of green unit pixel is in the range of 50 to 150°A and 200 to 300 °A and thickness of the second film of blue unit pixel is in the range of 50-150°A. It is noted that Winters discloses (column 16 lines 35,36,55,56, column 17 lines 4-12) that depending on the wavelength λ of light (color) emitted from a pixel having a particular second film (with a refractive index), thickness differs according to the equations 1 and 2 and an optimum thickness can be calculated and separately adjusted for different color unit pixels. Furthermore it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the ranges of thicknesses of second anodes of red, green and blue pixels as claimed, since optimization of workable ranges is considered within the skill of the art.

Regarding claim 21 Morita discloses the photosensitive film patterns of different thickness formed by a photo process using halftone mask.

Response to Arguments

Applicant's arguments with respect to claim 15 have been considered but are moot in view of the new ground(s) of rejection.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sikha Roy

Sikha Roy
Primary Examiner
Art Unit 2879